REMARKS/ARGUMENTS

By the present amendment, no claims have been added, cancelled, or amended. Accordingly, claims 1 – 40 are presently pending, and favorable reconsideration thereof is respectfully requested. Claims 1, 5, 21 and 36 – 40 are the independent claims.

Applicants also wish to thank the Examiner for having withdrawn the previous ground of rejection under 35 U.S.C. § 102 based upon the Celler et al. reference.

Allowable Subject Matter

Applicants wish to thank the Examiner for the indication that claims 9 and 24 would be allowable if re-written in independent form.

35 U.S.C. § 102(b)

The Examiner has rejected claims 1 – 8, 10 – 23 and 25 – 40 under 35 U.S.C. § 102(b) as being anticipated by the Limber reference ("Direct Reconstruction of Functional Parameters for Dynamic SPECT", Nuclear Science Symposium and Medical Imaging Conference, 1994; 1994 IEEE Conference Record Volume 3, 30 Oct.-5 Nov. 1994 Page(s): 1207-1211 vol.3).

Applicants respectfully submit that the Limber reference fails to satisfy the requirements for a finding of anticipation of claims 1 – 8, 10 – 23 and 25 – 40. In this regard, the standard for an anticipation rejection under 35 U.S.C. §102 has been well established by the Court of Appeals for the Federal Circuit, and is summarized in M.P.E.P. § 2131:

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). ... "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this is not an *ipsissimis verbis* test, i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990). ...

Independent claim 1 recites:

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1. A method of using a processor to analyze data signals representing tomography scan images of an organic object, the method comprising:

a) receiving data representing successive tomography scan images of said object;

b) performing calculations by imposing an inequality constraint to determine dynamic data values from said data, each of said dynamic data values representing a physical property of said object at a respective corresponding one of a plurality of voxels of said object at a respective corresponding time; and

c) producing a representation of said dynamic data values, representing said physical property at said voxels at said times.

The Limber reference, whose named authors include one of the named inventors of the present application, is an example of the known prior art dynamic analysis methods discussed in the Background section of the Applicants' specification, e.g. at p.3 line 21 to p. 4 line 5. Unlike the embodiments of the invention disclosed in Applicants' specification, the Limber reference assumes that the solutions will fit a non-linear bi-exponential model (eq. (2) on p.1208), and uses a non-linear least squares (NLS) algorithm to solve a non-linear system of equations (see eq. (3) on p.1208 for the non-linear system and the subsequent passage discussing the Levenberg-Marquardt method, and minimizing the norm of the residual in eq. (4)).

In contrast to Limber, the present invention as defined by the claims of the present application advantageously allows solutions to be obtained without having to make the potentially incorrect assumption that the solutions will fit a particular bi-exponential or other nonlinear model. This and other advantages of the claimed invention are discussed in greater detail throughout Applicant's specification, in connection with the Shape Constrained Least Squares (SCLS) embodiment disclosed therein.

With reference to the claims of the present application, this advantage over Limber is provided in claim 1 by "performing calculations by imposing an inequality constraint to determine dynamic values from said data, each of said dynamic data values representing a physical property of said object at ... one of a plurality of voxels ... at a respective ... time", which is not disclosed in Limber.

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The Examiner has referred to Figure 1 on page 1210 of Limber in relation to the claimed "inequality constraint", and has stated that "the inequality constraint is demonstrated in figure 1 on page 1210, [in] which the curves are shown in decreasing order, which is one of the inequality constraints shown in the specification ...". However, the Applicants respectfully note that Figure 1 of Limber does not appear to show curves in decreasing order. Rather, Figure 1 of Limber merely shows time-activity curves for each pixel of "simulated object 1", which is a 4x4 pixel object, with each of the 16 pixels having uniform initial activity (A) and identical half lives (λ) in each pixel (see p.1209, section 4, explaining the simulated objects, and page 1210, section 5, explaining the "Results"). The set of 16 graphs in the top half of Figure 1 represents the time-activity curves for the 16 pixels of simulated object 1 assuming a uniform initial activity A = 1,000 counts/second, while the set of 16 graphs in the lower half of Figure 1 represents the time-activity curves for the 16 pixels of simulated object 1 assuming a greater uniform initial activity of A = 10,000 counts/second. Thus, the two sets of 16 graphs shown in Figure 1 of Limber do not appear to be shown in "decreasing order"; rather, each set of 16 graphs appears to correspond to the spatial arrangement of the 16 pixels of simulated object 1.

Moreover, regardless of the order in which the curves in Figure 1 of Limber are shown, Limber fails to disclose or suggest "imposing an inequality constraint to determine dynamic data values" as recited in claim 1. In Figure 1 of Limber, the dashed-line curves plot the "true" time-activity curves for the 16 pixels of simulated object 1 using the actual values of the initial activity A and half-life λ parameters that define the simulated object 1, while the solid-line curves plot the time-activity curves for the 16 pixels of simulated object 1 using the calculated or reconstructed parameters $\tilde{A}$ and $\tilde{\lambda}$ obtained using the Parameter Reconstruction methods described in section 3 (pp. 1208-09) of Limber. Effectively, therefore, Figure 1 of Limber is merely a graph of calculational results (time-activity curves for each pixel); Figure 1 does not illustrate or otherwise disclose any information whatsoever about any constraints used to obtain or determine such calculational results. Neither Figure 1 nor the remainder of Limber discloses any "inequality constraint" being "imposed" to "determine" either the reconstructed parameters or the time-activity curves shown in Figure 1. Thus, Limber fails to disclose, "performing calculations by imposing an inequality constraint to determine dynamic values from

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said data, each of said dynamic data values representing a physical property of said object at ... one of a plurality of voxels ... at a respective ... time", as recited in claim 1. Therefore, the Limber reference fails to satisfy the above-noted requirements for a finding of anticipation of claim 1. Applicants therefore respectfully request that this ground of rejection be withdrawn.

Claims 2-4 are directly or indirectly dependent upon claim 1. Applicants therefore respectfully submit that these claims are allowable due to their dependencies, as well as the additional subject-matter that each of these claims recites.

Independent claim 5 recites,

5. A computer-implemented method of producing a representation of a measurable property which varies in time and space, the method comprising:

a) receiving a plurality of sets of values representing measurements of said property across an object at respective measurement times, each set being associated with a respective measurement time; and

b) producing a plurality of sets of values representing said property at a plurality of locations throughout said object at said respective measurement times, by minimizing a figure of merit function relating said values representing said measurements with said values representing said property at said plurality of locations, with a shape constraint imposed on said values representing said property at said plurality of locations.

Limber fails to disclose, "producing a plurality of sets of values ... by minimizing a figure of merit function ...with a shape constraint imposed on said values", as recited in claim 5. In this regard, the Examiner has referenced Figure 1 of Limber in reference to the claimed "shape constraint", and has stated that "the curve in figure 1 is based on a heart-like model". With reference to the definitions on page 1209 of Limber of the five "Simulated Objects", Applicants respectfully assume that the Examiner intended to reference either Figure 2 or Figure 3 of Limber rather than Figure 1, as only Figures 2 and 3 are described as corresponding to simulated heart models. In particular, simulated object 4 (to which Figure 2 corresponds) is described as "A simulated heart model. An 8x8 object with 20 pixels containing equal initial activities (see Figure 2). The four quadrants had half lifes of 4, 6, 8 and 10 minutes". Simulated object 5 is described as "A simulated heart model with attenuation", in which simulated object 4

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is varied by simulating water surrounding the object. In any event, simulated objects 4 and 5 are "heart-like models" due to the arrangement of the 20 pixels having the equal initial activity (A = 10,000 counts/second as shown in Figure 2), divided into "four quadrants" having different respective half-lives λ, namely, 4 minutes, 6 minutes, 8 minutes and 10 minutes, respectively. In other words, Limber only uses the term "heart-like model" to describe simulated objects with known true parameters (A, λ) that were used to test or assess the accuracy of the Parameter Reconstruction method (described in section 3 of Limber) in calculating reconstructed parameters ($\tilde{A}$, $\tilde{\lambda}$). Limber does not disclose or suggest using the known true parameters (A, λ) or any other knowledge of the "heart-like" nature of the model, as a "shape constraint" or otherwise, in order to arrive at the reconstructed parameters ($\tilde{A}$, $\tilde{\lambda}$); indeed, any such use would defeat the purpose of the testing or assessment described in sections 4 and 5 Limber. Thus, Limber fails to disclose, "producing a plurality of sets of values ... by minimizing a figure of merit function ... with a shape constraint imposed on said values", as recited in claim 5. Therefore, the Limber reference fails to satisfy the above-noted requirements for a finding of anticipation of claim 5. Applicants therefore respectfully request that this ground of rejection be withdrawn.

Claims 6 – 8 and 10 – 20 are directly or indirectly dependent upon claim 5. Applicants therefore respectfully submit that these claims are allowable due to their dependencies, as well as the additional subject-matter that each of these claims recites.

Each of independent claims 21 and 36-40 recites limitations relating to producing "a plurality of sets of values ... by minimizing a figure of merit function ... with a shape constraint imposed on said values ...". Applicants therefore respectfully submit that independent claims 21 and 36-40 are allowable for reasons including those presented above in connection with claim 5.

Claims 22, 23 and 25 – 35 are directly or indirectly dependent upon claim 21. Applicants therefore respectfully submit that these claims are allowable due to their dependencies, as well as the additional subject-matter that each of these claims recites.

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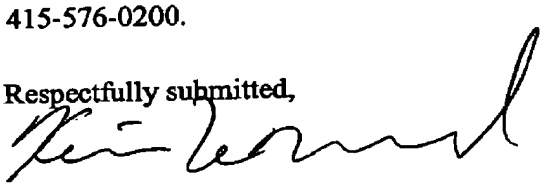
CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,



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